MAY 15 1922

The JOURNAL of GEOGRAPHY

A MAGAZINE FOR TEACHERS

Published by A. J. Nystrom & Co., for The National Council of Geography Teachers
George J. Miller, *Editor and Secretary*

VOLUME XXI — MAY, 1922 — NUMBER

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SUBSCRIPTION TERMS

The *Journal of Geography* is published monthly except June, July, and August.

The subscription price is $2.00 a year, payable in advance; the price of single copies is 25 cents. Orders for less than a half year will be charged at single-copy rate.

Postage is prepaid by the publishers on all orders from the United States, Mexico, Cuba, Porto Rico, Panama Canal Zone, Republic of Panama, Hawaiian Islands, Philippine Islands, Guam, Samoan Islands, Shanghai.

Postage is charged extra as follows: For Canada, 30 cents on annual subscriptions (total $2.30), on single copies 3 cents (total 28 cents); for all other countries in the Postal Union, 52 cents on annual subscriptions (total $2.52), on single copies 6 cents (total 31 cents).

The *Journal* is the official organ of the National Council of Geography Teachers and is sent to all members of the organization. The annual dues, $1.50, are payable to the *Business Manager*. Extra postage rates for copies sent to foreign countries should be added to the membership dues.

Patrons are requested to make all remittances payable to the *Business Manager*, in postal or express money orders or bank drafts.

It is assumed that members and subscribers wish to continue receiving the *Journal*. However, remittances must be sent promptly to assure your volume being complete.

Send manuscript and books for notice or review to the editor.

Send orders for back numbers to May, 1920 inclusive to the editor.

Published monthly except June, July, and August

PUBLICATION OFFICES: 450 AHNAIP STREET, MENASHA, WISCONSIN

All Business Correspondence, Membership Dues, and Subscriptions should be sent to the

BUSINESS OFFICE, 2249 CALUMET AVENUE, CHICAGO

A. J. NYSTROM AND COMPANY, PUBLISHERS

Entered as second-class matter January 15, 1919, at the postoffice at Menasha, Wisconsin, under the Act of March 3, 1879.

The JOURNAL of GEOGRAPHY

VOLUME XXI MAY, 1922 NUMBER 5

ECONOMIC EFFECTS OF NEW ENGLAND'S UNPRECEDENTED ICE STORM OF NOVEMBER 25-29, 1921[1]

GUY H. BURNHAM

Clark University, Worcester, Massachusetts

What is believed to have been the worst ice storm in the history of New England occurred in that section in the latter part of last November. This storm seemed to reach its greatest intensity over Massachusetts, the northern portions of Rhode Island and Connecticut and the southern portions of Vermont and New Hampshire, and caused widespread destruction in that region. Starting in the form of snow it soon turned to rain which froze almost immediately upon striking objects on the ground, the temperature of which had remained below freezing. This rain intermingled with sleet and accompanied at times by a fairly high wind continued unabated for over seventy-two hours. It froze to everything it struck—trees, wires, poles and buildings became covered with a glaze of ice which constantly increased in weight and thickness as the hours wore on. Under this ever-increasing burden the trees and wires groaned and creaked in the wind. Unable to withstand the severe strain, great limbs were torn from thousands of trees and crashed to the ground, many trees were entirely uprooted as were hundreds of telegraph poles with their maze of wires. For over three days, New England thus remained in the grip of the Storm King. As a result, transportation, by both trolley and steam road, was generally demoralized and with the former in some cases was completely suspended. Besides crippling rail transportation, the storm raised havoc with telegraph and telephone systems and also put electric lighting and power companies out of commission. When we look for an explanation for the occurrence of such a storm we find that it was due largely to the overriding of the cold layers of air near the ground by warm layers above. This warm air flowing in from the south was cooling as it rose over the cold air, and therefore was yielding

[1] A more detailed account of this storm at Worcester, where it was most intense, was published in *Bull. Am. Meteorological Soc.*, Dec. 1921, 2:139–141. See also *Monthly Weather Review*, November, 1921, 49:612 on General Meteorological situation.

rain and snow. The rain froze onto the cold objects, and the snowflakes, largely melted in falling thru the warmer parts of the southerly wind, refroze into sleet.[2]

The economic effects of such a storm are almost innumerable. While man can repair the damage done to his handiwork by the ravages of Nature, the injuries which Nature inflicts upon herself are irreparable. Thus it is with the damaged trees—hundreds of them were completely uprooted and so became at once a total loss, thousands more were so badly broken that they are but mere skeletons of their former selves, and still other thousands are so badly battered and scarred that their beauty will be marred for years to come. These statements can be borne out by the fact that in the city of Worcester (Mass.) alone, the Parks and Recreation Department estimates that between 7500 and 8000 trees were so badly damaged by the storm that they will have to be taken down at once and that from 5000 to 7000 others have been so badly mutilated that their replacement must take place within a period of five years. (See Figs. 1 and 3.) The falling of these trees and branches greatly impeded transportation on both city streets and country highways and imperilled the lives of travellers. In many cities, officials tried to cope with the situation by organizing emergency crews to clear up the debris but as so many trees fell, their efforts were of little avail. The branches continued to fall thruout the storm and the countryside came to look and sound like the shell-torn regions of France! Elms, maples and poplars were particularly heavy sufferers, while oaks and ashes seemed to weather the storm the best. In the orchards, the older trees of all varieties were badly damaged, altho many of the younger ones were also terribly bent and twisted. One large apple grower in western Massachusetts says that in his 2000-tree orchard so great was the damage that there is hardly a tree that will not have to be cut down. Other growers are more conservative in estimating the damage that they sustained. Just how great was the weight that caused all this destruction, it is hard to say, but conservative estimates, based upon samples of fallen branches place it at between five and ten tons, the exact amount depending upon the size and nature of the tree. Many evergreen trees became permanently bent to the northeast, as if wind-blown by prevailing southwest winds.

When many of the trees and branches fell, they swept away the telephone, telegraph, light and power wires that were in their path

[2] See *Monthly Weather Review*, February, 1920, 48:69–80.

and this added complications to the situation. The falling of the telephone and telegraph wires not only raised havoc with the local lines but also with the toll lines to New York, Chicago and other points, while the snapping of the high tension electric wires led to the cessation of trolley service, caused some factories to shut down and put

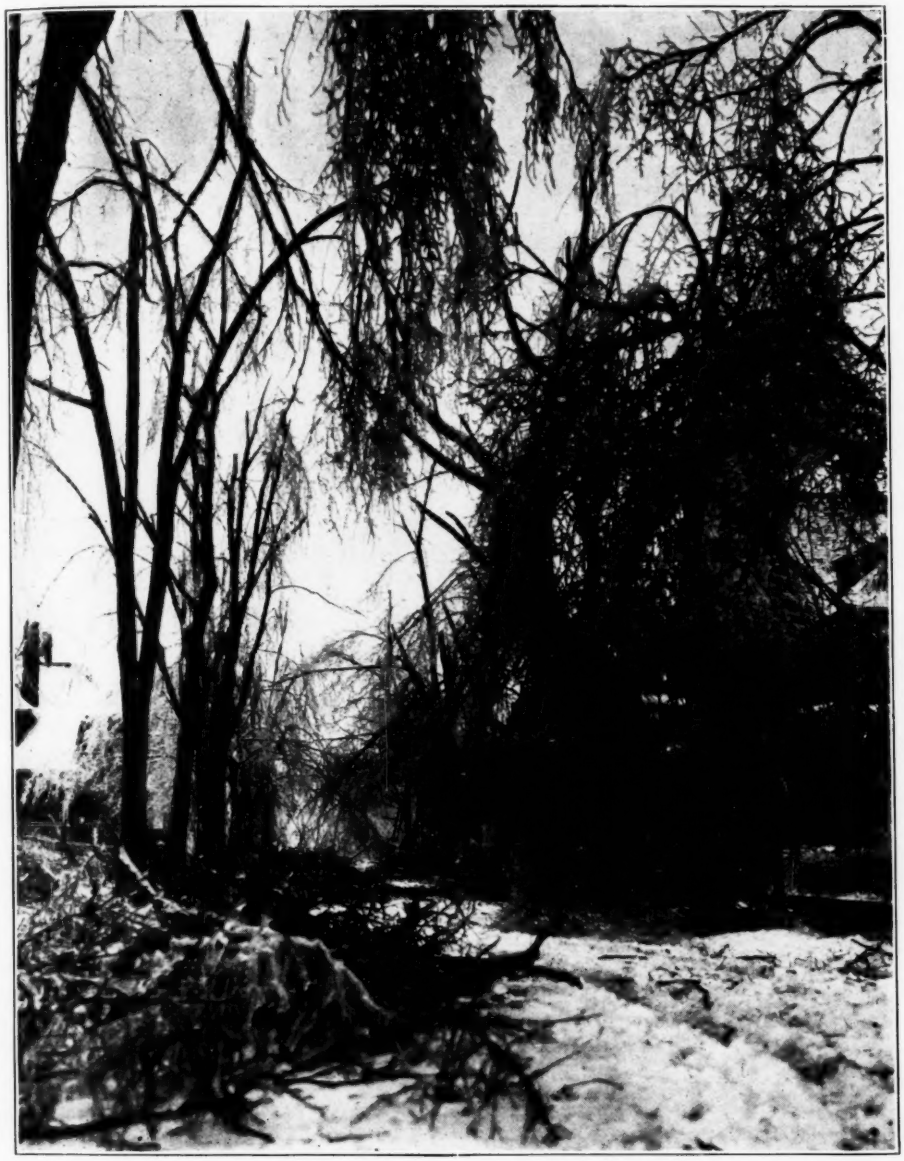

FIG. 1. Street scene in Worcester, Massachusetts, Nov. 30, 1921. (Photo by L. E. Davis)

many towns in darkness. Most of this wire trouble was in the country districts where the wires and poles exposed to the full fury of the elements soon had to give way before their onslaught. In one place just to the west of Worcester where the poles carrying the New York, Springfield and Pittsfield toll lines have eight cross-arms with ten wires

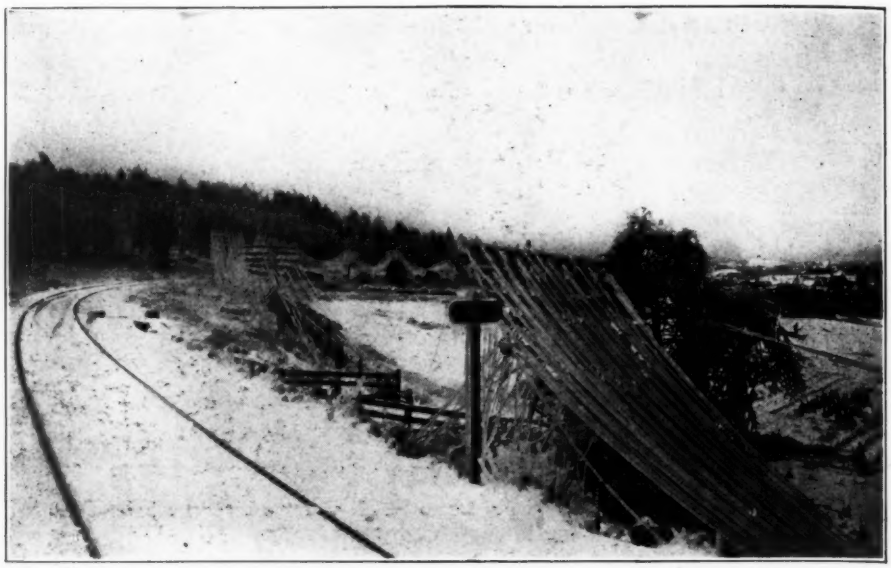

FIG. 2. Scene in northeastern Worcester, Massachusetts, along Boston and Maine tracks. (Photo by L. E. Davis)

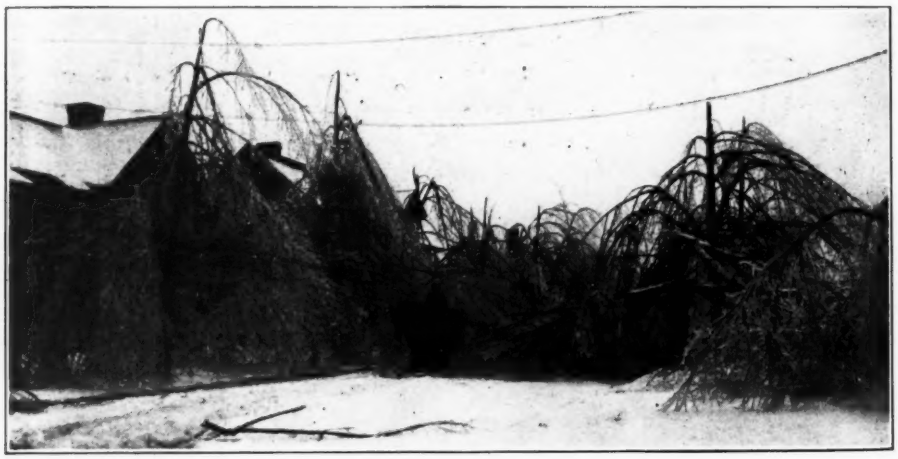

FIG. 3. Scene in Worcester, Massachusetts, at close of the great ice-storm of Nov. 26–29, 1921. (Photo by L. E. Davis)

to an arm, the average weight of the ice on the wires was found to be about a pound to the foot.[3] Allowing 110 feet as the average distance between poles, an example in arithmetic shows us that these wires were carrying a burden not far from 8800 pounds.[4] Little wonder then that

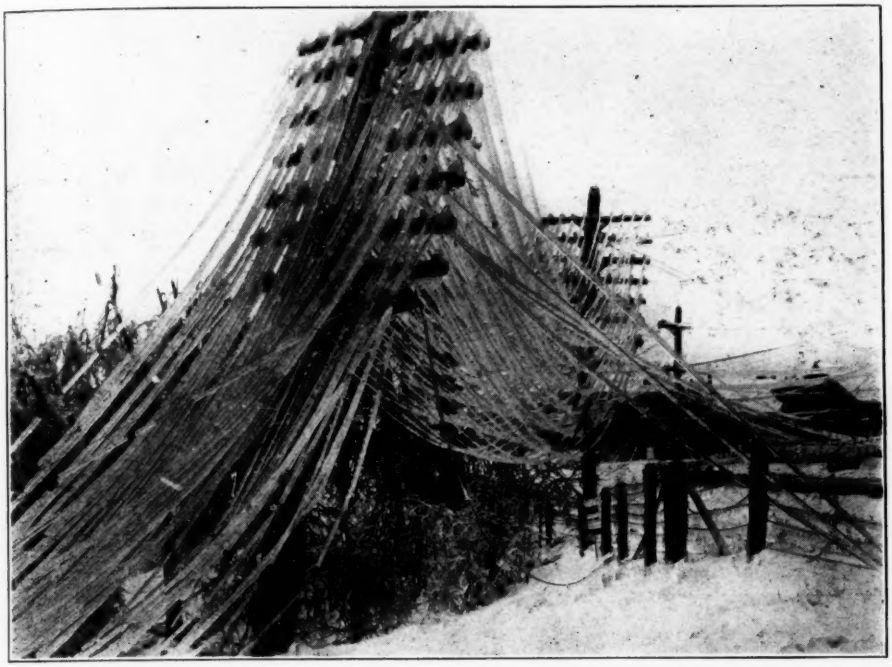

FIG. 5. Telephone wires at Summit, just east of Worcester, Massachusetts. Ice weighed 800 lbs. per wire between poles and was three inches in diameter. (Photo by New England Tel. and Tel. Co.)

this line collapsed over a distance of five miles! This is but one of the many problems which the telephone officials in central New England had to face. That they realized the magnitude of their task is seen by the fact that even before the storm stopped raging they had their

[3] Other observations were as follows: Piece of grass 15 inches high, weight 22 oz., or 1.1 lbs. per foot. Piece of ice off electric feed wire (¼ or ½ inch in diameter) 9½ inches long, weight 16.0 oz., 12 days after the end of the storm. This would be 1.3 lbs. per foot, or allowing for the melting which took place, about 1.5 lbs. per foot.—C. F. B.)

[4] (Cf. 1¼ lbs. per foot cited by G. H. Noyes, on p. 24, Mar., 1914, Climatological Data, New Jersey section. The snow and ice storm of Mar. 1, 1914, did about as much damage in northern New Jersey as was done by the great ice storm of Nov., 1921, in any region of similar extent in New England. Note also in this connection that in the severe ice storm which occurred in Michigan, Feb. 21–23, 1922, wires were not infrequently found which carried a burden of two pounds of ice to the foot. It may be also well to mention the ice storm of November 19–22, 1921 in Oregon, Washington, and Idaho in which great damage was done to wires by heavy ice coatings. An account of this storm is found in the *Monthly Weather Review*, December, 1921, 49:661–664.

plans perfected for the restoration of service and were preparing to send repair crews into the field. Reserve supplies of material fast melted away under the strenuous demands put upon them—wires, poles, cross-arms, insulators were all needed in the work of restoration and had to be bought and transported to the scene of action. This

FIG. 4. Ice-laden trees about a pond in Worcester, Massachusetts. (Photo by L. E. Davis)

FIG. 6. Wires and broken poles at Summit. The ice was two inches thick on vertical faces. (Photo by New England Tel. and Tel. Co.)

necessitated large freight and trucking expenditures and tended to hold up the repair work, but the men in charge overcame all these difficulties and accomplished wonders in the restoration of service. This is brought out by the fact that in the first ten days after the storm more than 100,000,000 feet of wire were laid on the ground or attached to fences and tree stumps in an effort to link up New England with the rest of the world. Because of the great expense under which this work must be conducted, telephone officials state that the storm will cost them nearly $1,500,000. The following summary of conditions issued about ten days after the storm by William R. Driver, General Manager of the New England Telephone and Telegraph Company is, I think, worthy of notice: "To show the magnitude of our problem two orders for copper wire aggregated 400,000 pounds each. We have on hand or on the way thirteen carloads of cross-arms, six carloads of pole line hard wire and over fifty carloads of poles. We have over 3000 men at work clearing up the wreckage, setting new poles, running lines and connecting telephones. Already toll service in Maine, New Hampshire, Vermont, Eastern Massachusetts and Rhode Island is nearly normal. In Western Massachusetts about twenty-five per cent of the toll circuits have been restored with temporary construction. We have been able to relieve the unemployment situation by taking on temporarily over 1000 unskilled men."

The telegraph companies—the Western Union and the Postal—also had similar conditions to face. On the Nashua, Boston, Providence and Norwich Divisions of the various railroads centering in Worcester, the former company estimates that at least 2000 of its poles are down, while in Worcester County alone the latter has 500 poles and 500 miles of wire to replace. To overcome these conditions and to bring telegraphic communication back to normal these companies brought in repair crews from points as far distant as Chicago. These men went to work with a will and slowly but surely the service was restored.

The Worcester Consolidated Street Railway, which operates most of the lines in Central Massachusetts, suffered a general disruption of its service. Trolley wires sagged and snapped, branches fell across the track—all of which led to the complete suspension of service. Of the 15,000 poles in the system, some of the officials estimated that ten per cent had been broken off by the storm. Fifteen steel towers carrying the high tension lines from the Millbury Power Plant to Worcester were destroyed as were 400 miles of telephone and signal wire. With such difficulties to overcome, the restoration of service could be brought

about but slowly. The city lines were first cleared and repaired and then the suburban lines were given attention. Service to Springfield, Webster, Spencer and other points was interrupted for several days, but one by one these lines were opened up and trolley service was resumed. After three weeks' hard work, the officials reported that they had every line in running order. The fast interurban road from Worcester to Boston was out of commission over a week because of fallen poles across its right of way.

Electric light companies also suffered great losses from the storm. In Boston and Worcester, tangled masses of wires filled the streets and many of the outlying districts in both cities were without lights for several nights. Over forty cities and towns suffered in this respect. In many of these communities kerosene lamps and candles had to be resorted to as sources of illumination and stores did a rushing business in these commodities. Because of the hazards connected with the reconstruction of this type of wire, the companies had great difficulty in securing men, for only the most experienced could be employed in this line of work. Service has been, however, gradually restored so that at the time of writing (one month after the storm), only the most remote districts are still without lights.

The high tension lines of the New England Power Company were also badly crippled—many wires were broken and towers were racked and twisted by the wind and sleet. This led to many communities being without power and in those places, the industries which depended entirely upon electricity were obliged to close until service could be restored. Stafford Springs, Connecticut, was hit particularly hard in this respect. Good work on the part of the power officials, however, soon had conditions back to normal.

Early in the storm, fire alarm systems in many cities became crippled. Fire hazards, already made great by falling electric wires, were thus increased. To minimize the danger, however, the main thorofares in the centers of the cities, were patrolled by the fire departments.

Railroad service was also badly affected and trains were hours off schedule because their crews had to stop to remove trees and poles which had fallen across their path. The Boston and Albany Railroad patrolled its lines in an effort to keep the track cleared but because of the magnitude of this task, it could accomplish but little. On the Central Massachusetts Division of the Boston and Maine, so much debris had to be cleared from the right of way that it was two weeks before normal service was resumed. Frozen switches, signals and turn-

tables on all roads also greatly interfered with traffic and kept the railroad men busy. After the storm, hundreds of men were put to work to clear the rights of way and as soon as this was done, the storm-shattered train service reached a state of normalcy.

And thus, it is that this storm which caused a loss of five lives and damaged property to the extent of $3,000,000 will always be remembered as one of the "Great Storms of New England."

A PROJECT ON BRAZIL[1]

MAUDE E. BARBER
North Woodward School, Detroit, Michigan

Teacher's Aim. To give a general knowledge of Brazil thru the study of its two greatest agricultural products—coffee and rubber.

Children's Aim. To form a stock company to give financial aid to South America in developing its resources.

MOTIVATING THE PROJECT

Creating the Situation. I read to the class a clipping from a daily paper, which stated the need of outside capital in developing South America's great resources and the necessity of the money interests of the United States taking a part in furnishing this capital, if we are to hold the trade we secured during the World War. Then I told them that Europe had always invested heavily in South America and had had, until the war, the larger portion of the trade but that during that time it had come to us. We spoke of the closed factories in the United States because of the shortage of foreign orders and our desire to keep our trade with South America.

ESTABLISHING THE PROBLEMS AND ASSIGNING WORK

Procedure. Then I said, "Children, suppose you had money to help in South America in which country would you want to invest?" Brazil, being the country of which they had heard most, was the choice.

I then asked how we might go about to help. Here they opened their books to find the products of Brazil. One said she would like to invest it in a rubber plantation because we use so much rubber in

[1] This article was sent to the *Journal* by Miss Alice Camerer, Instructor in Geography, Detroit Teachers College, as a sample of the work being done by the students in the night courses. Each teacher is required to plan, practice, and report on one project. It is an excellent example of the project and the socialized recitation. A. E. P. Assoc. EDITOR.

Detroit for automobile tires. Marie said, "I would like to buy coffee, for it says in our text that they have more coffee than any other product."

I then asked Paul, who had suggested a gold mine, if he thought he would have money enough to buy a gold mine alone. He thought not but that he could form a company to buy it. And one child said, "Why can't we play that we form a stock company to help Brazil." This was what I wanted. So I said, "If you were to form a stock company what would you wish to handle?" Coffee, gold, diamonds, sugar and rubber were mentioned. I then asked Jane, who had volunteered that her father belonged to a stock company, why she thought her father joined that company. She thought somebody had asked him. John said, "Jane, would your father put his money into a business just because somebody had asked him?" She hesitated and thought he would not unless he liked the man real well. "My father didn't know the man who got him to buy stock," said Culver. "Why did he buy it?" was asked. "I suppose he thought he could make money," said Culver. So we decided that any agent must show people that he had a good proposition before they would invest.

Then we came back to our own company. Which of all these things (I had written them on the board as they were given me) were we to buy or promote? Paul said, "Why can't we play we are agents and get the class to buy?" "Who are to be agents?" I asked. "Why can't we all be agents and sell whatever we wish to?" said another. This met with approval. Then we spoke of the points we should want to know about each before we bought. These I wrote upon the board. They were: where found, how grown, if agricultural products, cost of producing, where marketed, how much produced, and how shipped.[2]

SOCIALIZED RECITATION

The following day we decided, since we had come together to do business, we should have a chairman. As they were all agents, I was asked to be chairman.

John was the first agent to make his appeal. He had organized a coffee company and was acting as chief agent, the rest of the company being assistants in interesting people in their company. He informed us first that he wished to interest us in coffee lands, near Sao Paulo,

[2] For reference they were given Carpenter: South America; Bowman: Geographical Reader; Adams: Commercial Geography; Tarr and McMurry: New Geography, Second Book; Dodge: Advanced Geography; Goodyear pamphlet on rubber; Koebel: South America; Porter: The Ten Republics, besides a list of references to books to be secured at the city library.

pointing out the same on the map. He then spoke of the climate in this region being suited to coffee growing and of the reddish soil which was perfect for its growth. He described the method of planting the trees, told how high they grew, how long before a tree began to yield, and how many years a tree would yield. Then he called up his assistants. One brought some roasted coffee beans, told how they looked before roasting, how they were prepared for market, and that the Italian laborers, who did most of the work, worked very cheaply. Another told us that from ten to twelve million pounds were sent from Brazil every year and that there were excellent railroads running from Sao Paulo to Santos and Rio de Janeiro. Another pointed out on the map the steamship lines running from Santos and Rio de Janeiro to Europe and North America. The last one said she thought coffee a good investment for North Americans because we drink nine pounds per person per year. The agents selling rubber stock made similar talks explaining how the rubber was collected and prepared for market and the many uses.

When we had heard from all the agents I asked each set of agents if they were ready to agree upon the amount of stock which they thought they must sell to finance the ventures. But here arose a difficulty—to whom could they sell? No coffee agent wanted to buy rubber stock and vice versa. Marie, the practical, saved the day by saying, "Maybe if those who wanted to sell coffee would read about rubber and those who wanted to sell rubber would read about coffee, we might change our minds." To this they agreed. Meantime I helped a child prepare a report upon the article, "Changes in the Rubber World," *Journal of Geography*, October 1920. This showed that the yield from plantation rubber far exceeds that from wild rubber and is greatly increasing.

NEW PROBLEMS ARISE

Our discussion the following day was very interesting and showed the subject had been discussed at home. One father sent word that he had read that scientists had invented a synthetic rubber which might some time take the place of forest rubber. A child whose father is with a rubber company informed her that London is the rubber market for the world and that we couldn't get along without rubber in the hospitals nor for insulations, but that we could without coffee. As the arguments were given I wrote them on the board. Coffee won.

Then I asked if they would like to ask our coffee agent some questions. Some one asked where we could buy this coffee. It wasn't

coffee but coffee lands he wished to sell. Where? Five miles from Sao Paulo. How much would it cost? He hadn't thought of that and didn't know. No one had seen anything about the price of lands in their reading. I promised to help them out with that. How large a plantation would they want? He said they were very large and another said there were thousands of acres in a coffee plantation. Elizabeth thought we ought to go down and see this plantation before we bought. This class adores trips, so a trip was planned. Who would go? They thought they should all go, since they were all putting in their money.

PLANNING AN IMAGINARY JOURNEY

Our coffee agent went that afternoon to get routes, folders, prices, etc., for our trip. The next day he brought a folder from Lamport and Holt Steamship Company and one from the American Express Travel Department and informed us there would be a cruise leaving New York the next week for South America, stopping at the West Indies, going thru the Panama Canal, down the west coast of South America to Valparaiso, across the continent by train to Buenos Aires, then by boat to Santos and Rio de Janeiro and home up the east coast. The minimum fare was to be $2220.

Much stress was laid upon this cruise. We were shown the plan of the boat and told of the entertainment provided for passengers. Very little was said about the following route. Lamport and Holt steamers leave New York stopping at the Barbados, Bahia, Rio de Janeiro, and Santos. Return trip about $450. They decided we couldn't all go. They decided the agent should have his fare paid by the company he represented and that we could send two representatives, whom they elected. Then the question of route came up. The whole class time was spent in discussion and yet no decision reached. At the close of recitation I suggested they talk it over with their fathers and see which they thot a business man would take. Of course we took the short trip.

Then came the plans for our trip. What clothes were needed, heavy or light? Would our money be good there? Could the Brazilians understand us and what language did they speak? How long would the agents be gone? These were answered from their reading.

CORRELATIONS

The children going wished to write letters to those at home telling of the places, the ceremony on board ship to celebrate the crossing of the equator, their visit to the plantation and decision as to the advisibility of buying. These were done in their English class.

They also wrote to the Secretary of State of Michigan for a blank and information regarding organizing a company, to the main office of Lamport and Holt Lines, New York, and the Pan American Union for information regarding the price of land per acre, for we had been unable to find it. Of course, they wanted to know what the Pan American Union was. The International Encyclopedia was consulted but it wasn't very plain. When our letter came from Washington we found on one side of the seal, at the head of the stationery, a statement of the purpose of the Union, and on the other the names of the twenty-one republics represented. Annette asked if we might try to name them without looking at the list. They took pencil and paper and with the use of their text made a list. Of course there were mistakes. Several named the Guianas and Porto Rico. Some had perfect lists. One of the girls had taken our business letters home and typed them and had enclosed stamps for reply. Inside our reply from the Pan American Union, we found our stamp and there was none on the outside. The reason was worked out by the children.

The Arithmetic teacher talked with them of stock companies and they wished to really fill in the blank. One child asked, "Do they really think we are buying this land in Washington?"

It was found that the amount of capitalization must be stated in the articles of corporation. The unimproved land ranged from two to ten dollars per acre about Sao Paulo. They wanted the best. They were asked what other expenses would be involved—trees, buildings, machinery, railroad on the plantations, labor and traveling expenses. One stated that as the trees did not bear for three or four years there would be expense with no money coming in. I happened in the arithmetic room at this time and found them in trouble. They didn't know the cost of a coffee tree, machinery was higher there than here but they didn't know how much it would cost. It was at last decided to buy 2000 acres and capitalize the company for $3,000,000, which seemed adequate. Officers were elected as required by law and the papers made out.

RESULTS

Geographical Information Presented. Products of Brazil with emphasis on coffee and rubber; climate; soil; vegetation, and climatic conditions affecting location; some important facts concerning Manaos, Para, Sao Paulo, Santos and Rio de Janeiro; the people, their language; the money of the country; the Amazon and its branches; the distribution of the railroads; the trade with the United States and

Europe, and the desire of the United States to increase its trade as well as to hold what it now has with South America. (At the close of the project a false and true test was given. Class average 83%. The average was lowered because one child had 40%.)

Associated Information and Results. A knowledge of simple facts regarding stock companies; knowledge of the Pan American Union, its location, purpose, members; practice in the writing of business and friendly letters and the use of the library; an interest in commercial topics in current newspapers and magazines; an increase in the interest in books in geography and in a desire to possess them for their library.

FARMS AND FARMING IN THE LOWER ST. LAWRENCE VALLEY

RODERICK PEATTIE
Ohio State University, Columbus

THE IMPORTANCE OF AGRICULTURE

Tho the Lower St. Lawrence Valley is essentially a forest region, the immediate shores, and especially the South Shore, form areas of significant agricultural production. The farm houses lining the river road on the South Shore form a continuous village from Quebec to Cap Chat. One has but to ride on a train along this shore to appreciate that it is one of significant agricultural production. True, not all districts are prosperous. Some have the meager appearance of land recently reclaimed from the wilderness. Others have an unfortunate amount of swamp land. But the neat farm houses and the modern types of barns to be seen in other regions tell the story of prosperity and enterprise. It is noticeable that less machinery is used than in Ontario, tho many of the farms are equipped with the best machinery and production is carried on in a manner comparable to methods common in the province to the west.

From an agricultural point of view, the North Shore is much less interesting than the South. The Côte de Beaupré, which is but a gun shot from the Ile d'Orléans, which, in turn, is not much farther from the South Shore, is essentially like the South. All three places are intensively farmed for dairy products, vegetables, and small fruits for the city market. But the remainder of the North Shore is farmed only in a few favored spots, more especially Baie St. Paul. From Baie St. Paul to St. Simeon the margin of the plateau is tilled and in one place, behind Les Eboulements, there are farms for a number of miles inland.

There is some arable land about the mouth of the Saguenay, but the settlements beyond give decreasing attention to crops. For example, at Les Escoumains there are farms where grains, vegetables and dairy products are produced, but almost wholly for local consumption. The hay crop is in evidence no matter how far north along the coast one may go. Thru the extent of the shore the farms are generally quaint and in a notable number of places the methods of tillage are unusually primitive. This last character is due to the isolation which this area has suffered and therefore is of historical importance.

EARLY AGRICULTURE

The permanency of the colonization in early days of settlement was threatened by the difficulties attending agriculture. Methods of farming are easily inherited and hard to cast off, and new methods are even today more liable to come from the scientist than from the farmer. The peasants of France who essayed this wilderness were abruptly transplanted to their new surroundings, and for a long time had great difficulty in adjusting themselves to the strangest of the new elements, the climate. The climate was such as not to be easily understood by the seventeenth century farmer, or overcome by his simple methods.[1] Plant selection was a practice scarcely known. In the critical years when a good crop was a thing of vital importance the farmer was still experimenting with the climate, failing as often as succeeding. The short growing season was one of his greatest hardships, and even today the government is investigating means to cope with it. The soil was an easier matter with which to acquaint one's self.

Some of the forces militating against agricultural success were not inherent. For example, the fur trade offered too great an attraction to the adventure-loving colonists. It was the easiest means to wealth, and its hardships were seldom dull and always picturesque. Why, indeed, should one farm when meat and fish were so much more easily obtained than the grain, for could not one fish at the foot of the farm and shoot in the woods at the back of the house? It has even been said that because of the Norse blood in the Norman settler a roving spirit ran thru the veins of the French Canadian, but the idea is far fetched.

The short growing season is complemented by a long winter during which time either, thru turning to the pursuits of hunting or trapping, or thru the enforced indolence of the hibernation, the habitant's mind was naturally turned from husbandry for a considerable period. Hoc-

quart in 1737 reported to the King that the long winters were endangering the industrial nature of the peasants.[2]

Of course, one great difficulty in pioneer agriculture was the density of the forest stand. Man literally fought, not only the Indian, but the wilderness as well. It is said that a man could clear an arpent and a half of timbered land in a year, if he devoted all of his time to it.* This was not a trifling task especially for a people unused for generations to pioneering.[3] Settlers soon learned the practice of felling trees in the fall, burning them in the spring, perhaps piling the remains for a second burning and then sowing broadcast the wheat, oats, or white turnip seed. Usually two such crops were sowed and then for four years wild forage crops were reaped. Perhaps after two years of pasturing on the land the stumps were sufficiently rotted to be pulled.

Tho the Frenchman had terrible geographical difficulties to overcome, and temperamental peculiarities to meet, there were certain spirits in the history of the early colony that persisted in the idea that agriculture was necessary to the life of the settlements. The earliest leader of the colony, Champlain, was an ardent believer in the prime utility of agricultural development. Thru his inducement the first farmer of Quebec settled upon the land that now holds the cathedral and seminary of Quebec, and there made his living from his farm.[3] In 1626 agricultural colonization was begun seriously. The method of introducing it into the country was, naturally enough, the feudal or seignioral system. This served the purpose of organizing communities, and providing them with administration, a grist-mill, and roads. By the year 1700 forty-seven new parishes had been instituted in New France. Since the first readjustments agriculture had flourished in the Lower St. Lawrence Valley except for the period between 1760 and 1850. These were the ninety years following the cession of Canada to the English. Left without their financial backers, and put under new conditions of trade and commerce, the art of farming stagnated among French Canadians. They emerged in 1850 with the same methods of tillage that they had had in 1760. There was no fertilization of the land worthy of the name. Not only did lands become poorer but the farms were subdivided. Governmental and community road-building were at a minimum and hence no new lands were opened up.[3] That careful observer and recorder of early American life, Kalm, in 1772 noted that the country about Quebec, tho apparently of great fertility, was so poorly utilized as to yield only the bare necessities of

* A linear arpent is 191 feet. A square arpent is .871 English acres.

life.[4] Bouchette, who wrote an excellent "Topographical Description of Canada" in 1832, says that the method of tilling was far behind that of Europe and lays it to the economic isolation and lack of need for intensification.[5] However, he notes a significant production in wheat, oats, barley, peas, rye, buckwheat, corn, maple-sugar, potatoes, hay, flax, butter, and wool. Before 1820 little manure was used on the fields and the crops were seldom rotated. Early fertilization consisted of burning the stubble, as few animals were kept and there was a scarcity of manure. Semple tells us that until 1837 it was the practice among some farmers to cart the manure out on to the ice to be carried away in the spring.[6]

It was during this period that the first important emigration to the United States took place and in the five years from 1845 to 1849, 20,000 French emigrated from Canada to the United States. However, the priests, for the good of the country and the spiritual welfare of their flocks, made every effort to keep the populace together. The aid and encouragement which the Church gave at this time is one of the factors in the strong allegiance which the French Canadian pays to that institution. The Church took the place of the temporal leadership and this accounts in part for the tendency to substitute the church for nationality.

SIZE, SHAPE AND TENURE OF FARMS

The size of the farms, is, as might be expected, smaller in the counties near to the City of Quebec than elsewhere. Montmorency, L'Islet, and Bellechase, for example, have many holdings of less than an acre. Montmagny has few of the smaller holdings, but this fact is less significant when its small acreage is taken into consideration. In the County Charlevoix many of the farms extend from the relatively small cleared portions into the forests, which may explain why its holdings are larger than those in Montmorency, tho the latter is nearer to Quebec. Also much of the country has been settled in times which are recent as compared to the settlement of the Côte de Beaupré, which constitutes the settled portion of Montmorency. The older the settlement the smaller the farms, because of the patrimonial grants. This sort of division and redivision assumes great proportions when we find such records of continuous occupancy of the land within one family as these:

Robert Caron married at Quebec, Oct. 25, 1637 to Marie de Crevet, born in Normandy. He was one of the first inhabitants of Ste. Anne and St. Joachim. His descendants still occupy the land which was ceded to him.

"Honorable Homme" Jean Cochon of St. Martin de Dieppe married Marguerite Cointal of the same city. In 1634 they established themselves at Chateau-Richer where their descendants still exist.

There are examples also of the families that have migrated and it is interesting to continue:

The descendants of Paul de Rainville and Pauline Poete of the Côte de Beaupré had children who have carried their seed to "divers points of Canada." 1640[7]

The shape of the farms, a matter which attracts the attention of every traveller has a social significance. Thru all of the region where there is any great stretch of flat land the farms take on a characteristic form. They are long and narrow, with the smaller dimension as a frontage on the river. A similar peculiarity is to be seen in the Spanish and French grants along the lower Mississippi. On both of these rivers the farms inherit their forms from the days when the river was the sole means of transportation and therefore access to the waterway was sought by all. The original grants on the St. Lawrence varied in different portions of the valley, but from three to thirty or forty arpents[1] seems to have been a common proportion. This not only gave to all riparian rights and the privilege of fishing, but also it divided the valuable marshlands of the river so that each farmer might cut hay thereon. These farms have been further subdivided so as to give each of the new owners a portion of all the rights enjoyed by the original farmer. The consequence is, that no farmer is isolated from his neighbors, as the houses of a single range of farms are directly on the one road of that range and the farms being very narrow the houses are necessarily close together. On the other hand, there is a notable lack of grouping and community interests. The South Shore is one continuous village thruout its entire length. The result is that altho the French Canadian has developed the social instinct and has had his neighbor forced on his consciousness, he has not felt the stimulus of the life of the village as it is generally thought of. This continuous neighborhood has lacked all of the rivalries of which civic interest is born. Advantages and disadvantages of this fashion of living are much discussed. The neighborly distribution of houses along a single road, each on its long, narrow rectangle, is certainly a significant factor in the extreme social instinct of the habitant. On the other hand, I am of the opinion that it works against as well as for the furthering of this characteristic. For the organization which is the strongest in the lower valley is not the community spirit, but the parish spirit. This is constantly furthered and fostered, not by geographic conditions, but by the priest. In much of the country there is little that

resembles a town. Many of the smaller communities are merely a few additional houses set in between the farm houses, representing some retired farmers, a small mill and its workers—who usually have their farms as well—the church and a commissary. This is more especially true of the South Shore.

The tenure of the farms takes on in places a feudal aspect. The feudal status of the countryside was abandomed by an act of legislature in 1854. This Seignioral System, as it was called, had, however, little of the social and military characteristics of the French feudalism from which it sprang. Nevertheless the title of the land and the rights to certain monopolies, as well as the responsibilities of developing the district were actually vested in the *seigneur*. In 1854 the habitant was released from all obligations except a certain small rent which was a return on the land as well as a compensation, in part, for some of the privileges of which the landed class was deprived. Also the farmer was allowed to buy his land outright, thereby sealing the doom of the system. The habitant has been surprisingly reluctant to purchase his land and hence the tenure of much of the land today forms a survival of an institution strangely un-American.

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THE IMPORTANCE OF BELGIUM AND HOLLAND

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These two small nations both have a population, a commerce, an international prominence and an historical significance far greater than their small size would suggest. Together they make up only one hundred-fifty-fourth of the area of Europe or one twenty-three hundredth of that of the lands of the globe. Yet they have one thirtieth of Europe's people, and nearly a hundredth of the world's population. In respect to commerce, they have about one twelfth of Europe's total

and about one twenty-fourth of the world's total. In regard to international prominence, both are numbered among the world's ten leading nations; they have important colonies; in their cities many international tribunals and congresses convene, and the deliberations of their statesmen and the reports of their scientists are given respectful consideration by the leaders of other nations. Historically these nations have played an important rôle for centuries, and have made many more than their expected share of contributions to civilization—discoveries, inventions, works of art, improvements in law, etc.

Table I gives statistics as to area, population and commerce.

TABLE I

	Area	Population		Commerce		
	Sq. Mi.	Total	Per Sq. Mi.	Imports	Exports	Per Capita
Belgium.....	11,373	7,685,000	673	612 mil.	903 mil.	197
Holland.....	13,200	6,779,000	514	1,136 "	567 "	251

ADVANTAGEOUS LOCATION

What are the geographic bases for the prominence of this tiny area? In the first place, it is very favorably located for commerce. To the north, close at hand is the most thronged portion of all the ocean, the English Channel and the North Sea. The great importance of the ocean to these nations is suggested by the fact that three of the world's greatest eight seaports are here—Antwerp, Rotterdam and Amsterdam. Crossing the area, is the world's most used inland waterway, the Rhine. The area itself is a part of the north European plain along which extend many railroads. The countries near Belgium and Holland include all but a very few of the world's progressive nations. To the west lies England, to the south, the industrial portion of France, to the east is Germany and not far away to the north is prosperous Scandinavia. Because of this location Holland and Belgium are crossed by a large share of the commerce between central Europe and the North Sea, and between Germany and France.

ADVANTAGES OF LEVELNESS

A second great advantage possessed by these two countries is the level land. This facilitates agriculture, road making, canal digging, transportation of all kinds, and the construction of factories as well. Holland leads the world in respect to the development of transportation. However, Belgium leads in railroad mileage relative to area

(480 miles of railroad to each 1,000 square miles of area). Its rates are the lowest in Europe. Netherlands, with more waterways and many small islands, ranks sixth in this ratio, with 160 miles of railroad per square mile of area. However, the service between Rotterdam and Amsterdam is perhaps the best in the world. Splendid trains run every fifteen minutes or so thruout the day, and the rates are low and wrecks almost unknown. The level land facilitates agriculture in many ways. One is that the soil is deep, and little subject to erosion or to leaching. Artificial fertilization has helped to make the better soils of these countries remarkably productive. Belgium leads the world in the average yields per acre of several crops, and in respect to several, Netherlands ranks second. Table II gives the average yield per acre in recent years of six crops in Belgium, Holland and the United States. It will be noticed that the American yield averages only about half that obtained in Belgium.

TABLE II. Yield per acre of Chief Crops

Crop	Belgium	Holland	United States
Potatoes	280 bu.	253 bu.	102 bu.
Sugar Beets	2¼ tons	2 tons	1½ tons
Wheat	39 bu.	36 bu.	14.7 bu.
Oats	63 "	51 "	30 "
Barley	51 "	50 "	25 "
Rye	34 "	28 "	18 "

Altho farming is carried on so intensively, the population of Belgium which is engaged in manufacturing is so large that it needs must import much food. Indeed the chief item in its imports is food. Netherlands likewise imports much food, but it pays for its imports partly by exporting other foods, especially dairy products. Both of these countries have large areas less favorable for tillage than for grazing. In Belgium the sandy coastal strip has been reclaimed by planting grass and now it produces many fine Flemish horses, cattle and dairy products, most of the latter going to London. In Netherlands, much of the land below sea level is too wet to grow much besides grass. Under these conditions, the production of livestock is extensive, as is shown by Table III.

Nearly one-half of Holland is, at high tide, level with or below sea level. Much land near the Zuyder Zee has been reclaimed. Great dikes are built around an area of swampy land and then the water is pumped, partly by windmills, from off the land into the sea. The

Netherlands is chiefly a low plain being a continuation of the plain of northern Belgium and western Germany. Much of the area is part of the Rhine delta also. The sandy coastal strip and the wet low-lying areas produce rich grass and thus dairying is the important industry, and the Dutch dairy products are in demand in many portions of the world. Garden and dairy products are the chief exports, while manufactures make a large share of the imports. Holland is now a commercial and agricultural nation rather than an industrial nation. The lack of coal, of water power, and of all minerals but clays and sand, have put it under too heavy a handicap for successful competition with better endowed nations.

TABLE III. Number of Horses, Cattle and Swine per square mile together with the rank of the country as compared with other nations

	Horses		Cattle		Swine	
	Number	Rank	Number	Rank	Number	Rank
Netherlands.....	26	II	165	I	106	IV
Belgium.....	23	III	160	II	124	II

GREAT MINERAL WEALTH OF BELGIUM

A fourth great asset possessed by this area is great mineral wealth. However, in this regard Belgium and Holland fare very unequally. Holland has almost none aside from potters clay while Belgium is one of the rich spots on the globe in respect to coal, iron and zinc. It also has limestone, glass sand, and shale and clay suitable for brick, pottery, etc. Belgium ranks about fifth in the amount of coal mined, and about fourth in the amount of pig iron manufactured. To be sure its iron ore deposits are playing out, but high grade ore can be easily imported from just across the French border.

A fifth great asset is the stimulating climate. The climate is cool enough to favor intellectual activity, but not so cold as to be numbing, nor are the extremes great enough to be very harmful.

FORMER ADVANTAGES OF SMALL SIZE

Certain advantages have been derived in the past from the small size of these countries. They developed early. Holland has been one of the important commercial nations of the world since the sixteenth century. The Dutch began their career on the sea as fishermen and fishing continues to be a great industry. In the sixteenth century

they became distributors for oriental merchandise from India, etc., brought to Lisbon by the Portuguese. Soon they undertook trips around Africa in order to get the oriental products themselves. The development of this early commerce was the real basis of Dutch commercial importance. It helped the Dutch secure choice colonies in various parts of the world, especially in the East Indies. Skillful management has enabled them to carry on a large amount of commerce with them (three-fourths of the total export from these colonies goes to the Netherlands). This early start has also enabled them to build up a profitable business of carrying the commerce of other nations. The Dutch have a large fleet of merchant ships carrying on commerce in all parts of the globe. They are surpassed in per capita tonnage only by Norway and the United Kingdom (the tonnage for Norway being .8; United Kingdom .4; and the Netherlands .3 tons per capita). Holland ranks seventh among the nations of the world in total gross tonnage.

Belgium likewise had the precocious development which Ratzel has pointed out as is characteristic of small areas. Before the English had much of a textile industry, Flemish weavers supplied a large share of the north European demand for manufactured woolens and linens. Indeed Flemish weavers helped establish the textile industry in England. Likewise in navigation, draining, deep mining, and certain aspects of government, the "Low Countries" have taught the world.

ADVANTAGES OF ABSENCE OF BARRIERS

A seventh advantage, at least in times of peace, is the general lack of effective natural barriers in this area. This has aided the development of commerce but it also has disadvantages. At various times, as during the recent World War, invading armies have swept over the level plains of Belgium and thus brought about great destruction. Netherlands has been invaded less frequently partly because about two-fifths of the land in the Netherlands is swampy, and by cutting the dikes, a larger portion may be rendered impassable for an army.

HANDICAPS OF SMALL SIZE

In spite of all these advantages, the future of these nations is not very bright. They are too small; the population is cramped physically and intellectually. Other nations with larger areas and greater resources have a great advantage. The natural resources, great as they are, are being rapidly exhausted. Already Belgium's iron is nearly gone, and coal is commonly mined to a depth of 3,000 feet, much

deeper than in any other nation. Furthermore seams only eighteen inches thick are considered valuable enough to mine, while in most lands none less than twenty-four inches thick are considered worth the large amount of additional labor required to recover a thin seam. Another result of the smallness of area is that there is little sectional diversity in respect to crops. Hence adverse weather conditions usually are nation-wide, and the resulting crop failure is a national calamity instead of a sectional one, as in larger nations. Most important of all, perhaps, is the fact that small nations tend to approach the limit of their resources earlier than do large nations. Hence expansion and rapid progress is stopped sooner. The glory of these nations already probably lies in the past. From the standpoint of the youth of today, this fact is a great handicap for optimism as to the future is almost necessary for success. Hence it is no wonder that many citizens of these tiny countries have emigrated to lands where the future is still rosy.

A COMMERCIAL GEOGRAPHY PROJECT IN THE EIGHTH GRADE[1]

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If the course of study in other systems is the same as that under which I teach, other eighth grade teachers feel as I do, probably, that we are asked to serve a sort of hash of subject matter that has been presented fresh in some other grade. Especially is this true in commercial geography. Nearly all of the material has been touched upon in a previous grade, and some of it has been pretty thoroly taught. The mere fact that we are going to take it up in a more grown up way has not sufficient appeal, and it has always seemed necessary to initiate a project in *that* subject if in no other. I have been asked to describe the project which we have just finished. I shall tell you briefly our situation, a few types of the classroom performances which it has involved, and what I believe the children have gained from it.

In the first place, we have as difficult a situation as it is possible to have for carrying on project work; but this fact makes projects all the more necessary and valuable. The children in my room are nearly all of foreign parentage representing ten different nationalities. Very few of them hear English in their homes and, with few exceptions, they

[1] Presented January 21, 1922, before the Massachusetts Branch of the National Council of Geography Teachers at Boston, Massachusetts.

do not have access to periodicals and illustrative materials. No materials beyond the barest necessities are furnished by the city. What then has been the source of our material? The manila paper for the book was furnished by the teacher, who allowed a pupil the great privilege of going down town to buy it. The pictures were brought in by children who have neighbors or relatives who would let them cut up magazines; they have been cut from seed catalogues, from discarded geographies, and from a pile of my old *National Geographic Magazines* which I somewhat hesitatingly sacrificed to the cause. One little Jewish girl has contributed advertising material from her father's grocery store. The charts which last year's class made had become torn hanging in the closet and the children were therefore allowed to take some of the illustrative material from them. This brought a rather interesting reaction from one boy who asked in class what was the use of our making this book if other classes could tear it to pieces. I think he has been sufficiently assured by the satisfaction of the teachers and principal in what we have done that it will be very carefully preserved.

One of the first questions in relation to a project is, "How did you get it started?" I have to confess that projects which we have initiated in September have been suggested usually by the teacher. I believe, however, that if a situation is created that causes the children heartily to adopt the suggestion, the execution may be as truly purposeful as if it came from the children themselves. At the beginning of school, I hung up some of the charts and exhibits that other classes had made. I let them hang around the room all day with no comment except to answer the questions, which were asked freely by the pupils, who manifested a good deal of interest. It was not long before the question came, "What are *we* going to make this year?" Then I told the class what our new subject was, and something of its scope, telling them to think about it over night and to bring suggestions in the morning. They decided (under stimulation) that they wished to do something new and original. In the morning, no suggestions were forthcoming. Is my experience unique,—or have other grade teachers occasionally faced the same situation? I said I had an idea which I would tell them for their consideration if they wished. They wished, and I suggested the making of a Thanksgiving Menu. I can truthfully say that the suggestion was whole heartedly adopted and carried out.

The adoption of the plan came just as the course of study in drawing called for a series of lessons in lettering and we obtained permission from the drawing supervisor to do the lettering for our menu instead of

the prescribed lessons. The book was twenty by twenty-four inches. The class planned the size of lettering for the title page and each one lettered the words "Thanksgiving Menu." The best one was chosen by the class and transferred to the Menu. This left the other pupils with a very careful bit of lettering which was not to be used. Out of this situation came the request that each one make a small book of his own, which they did. This proved valuable, as each pupil has at all times had some important task, even when he has not been a member of a committee. The picture to decorate the cover was chosen by voting.

The first page was to be the menu itself. The pupils looked thru their textbooks, each making a list of the foodstuffs they thought we should study, putting beside each an article of food made from it which we could serve at a Thanksgiving dinner. We consolidated these on the blackboard, and, with sample menus which pupils had found at home, we arranged our menu, which was then carefully lettered by a girl chosen by the class.

As each course was taken up, various committees were chosen. One child lettered the name of the course at the top of the page, using upper case letters for the foodstuff we were to study. For example, in "Chicken Soup With RICE," *rice* was lettered with capital letters, as was *wheat* in "Croutons Made of WHEAT Flour."

The most popular committee was the one to receive, collect, and paste pictures. It was great fun, when geography time came, to go to the cupboard behind the piano to search thru old magazines and geographies, to cut out pictures, arrange the page, subject to the approval of the class and to paste in the pictures.

A committee was usually chosen to draw maps of production, manufacture, and transportation, and several of the pages have diagrams which were worked out or copied by committees of two.

The pages on wheat have prints made by the pupils from negatives taken by the teacher in the wheat fields of Indiana last summer. The making of these photographic prints was a joy to the children, many of whom printed them for their own menus.

Usually when the class chose between "writing a story" and making an outline, the story "had it" by a large majority; but the facts about wheat and about corn were arranged on an outline, and these outlines were lettered in the big menu, each taking a whole page. In nearly every other course, the "story" of the foodstuff was written and mounted. This was sometimes the composition chosen as best

from those written by each pupil individually and at other times it was written by the class together, all contributing from texts and supplementary books. This was a very popular exercise.

A recent visitor asked if I thought the children had learned the geography required by the course of study. I have not given a written examination but, from frequent oral reviews incident to our project, I have every reason to believe that the children have acquired fully as much knowledge as any class I have had.

The question was also asked, "Hasn't it taken too much time?" Frankly, yes, it has. It has taken some sixteen weeks, when the time usually given to foods is ten weeks. The subjects of clothing and shelter have had to be studied partly in silent reading and science periods. Our study of economics has included such subjects as production, transportation and consumption of goods.

The important outcome of the project from a purely educational standpoint has been in the development of the pupils' initiative, power of organization, and skill in judging. Under its influence, I have seen one Armenian boy aroused from an indolent, uninterested child to the most alert, active pupil in the room. In the fall, I called him lazy. In January, I found him the first to discover that the new "World Almanac" has "lots of things about sugar," that this or that reference book has a whole chapter about fruits, and "please may I use it in class?" I have seen a gradual but sure development of a spirit of courtesy and helpfulness toward each other. The pupils' eyes have been opened to discover interesting geographical items in the newspapers, so that one whole section of our bulletin board has been given over to such clippings. I believe that to some degree geography has become to the pupils a subject of live interest; and, from the viewpoint of a teacher of geography, I believe this to be the most important result of our Thanksgiving Menu.

NOTES ON THE GEOGRAPHIC SIGNIFICANCE OF SOILS—I

A NEGLECTED SIDE OF GEOGRAPHY

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The science of soils has been growing vigorously year upon year with a very fine amount of achievement to its credit. It has long since achieved recognition as a distinct branch of knowledge. In some curious manner this subject has received but slight attention from the

geographer. Our competence to evaluate soil conditions is in general slight, and does not extend much beyond a few poorly understood generalizations of soil fertility and geologic origin. It is possible that soils are to be ranked quite as high in the environment as is surface. In generalizations covering large areas they are of much inferior value to climate, but usually the smaller the region the more significant does an understanding of soil conditions become. And the future of geography as a field of research lies immediately in the more intensive working of restricted areas.

The matter of soils cannot be dismissed by the notion that soils are fertile or infertile any more than climate can be disposed of as being beneficial or hindering. There is little or no critical value attached to most of the meagre statements about soils that appear in the literature of geography. How much attention is paid in our geographic instruction to geological formations as sources of soil materials or to physiographic processes as soil forming agents? The study of physiography as a group of dynamic processes modifying the earth's crust is really a phase of dynamical geology. As the study of the origin and nature of land forms and of soils, together with the study of weather and of climate, it becomes the physical background of geography. Such a course, however, is practically not in existence. This physical background is developed adequately only on the climatologic side. The study of land forms is still largely a hope and that of soils is essentially a missing quantity in physical geography today.

Physical geography needs redefinition from the geographic standpoint and soils should be considered in it not merely (1) as the products of geologic formations and (2) as the result of physiographic processes, but as well (3) as being biologically modified, (4) as being profoundly affected by climate, and (5) as being changed by the processes of time. These five things represent the genesis of a soil and are fundamental and similarly significant notions of soil science. With the idea of the differentiation of soils according to origin in mind, the geographer is further interested in this subject in two ways, the question of soil fertility, and of the management of soils for specific production. Soil origin is the study of the environment that has resulted in the soil, soil fertility is the study of soil properties that affect its use, and soil management is part of the record of man's experience in gaining a livelihood from the land. Are not all three considerations so important that they must find emphatic recognition in the field of geography? One looks in vain in any textbook of geography or of physiography for

an even partially adequate recognition of this factor. Only one school it would seem has considered a course in soil geography.[1]

Soil geography is as appropriately a branch of geography as is climatology. The study of soils as such is a separate science from which the geographer should learn to borrow, but in which considered separately he is no more interested than he is in meteorology. Meteorology as such is properly considered a branch of physical science. It has come to be taught in connection with geography at a good many institutions because often the geographer has been more interested in it than has the physicist, but the observations and principles of meteorology are essentially not in the province of the geographer. Similarly, where no courses in soil science are given in agricultural or other divisions, it may be desirable that the geographer provide them for his own interests. But this is not soil geography. Soil geography as yet is unformulated, but its guiding purpose is the study of the utilization of soils by man. We should have a knowledge of the different types of utility of the various types of soils, of the problems and possibilities of their improvement based on economic rather than technical considerations; in short we should know the economy of each important soil. It is possible also to study soil regions in terms of use as we study climatic regions in terms of human activities and progress. Agricultural colleges in many cases do that sort of thing now as an appendix to soil work, but they do it incidentally and mostly from the standpoint of individual crops. A soil region embraces a group of soils, in which certain dominant soils usually determine the soil practices for the area. In the soil region the utility of the individual soil can be considered only in terms of what might be called the soil association. This group economy has as yet received no systematic investigation. A balanced soil geography will inquire into the whole matter of the economy of the soil region, the competition between farm crops, and between plow use and grazing and forest use of the land. It will register the experiences of past and present use as to destructive exploitation or sustained yields of more intensive production. It deserves recognition as an important adjunct to the balanced study of the economy of the land.

At the least every student of geography should have training in the origin, fertility, and management of soils. These matters should form part of any serious introductory course in geography, whether it be to freshmen in college or to the teachers who are preparing at normal

[1] The University of Chicago established such work in 1921.

schools. The professional student of geography should have a course in soil science comparable to his work in meteorology, physiography, and plant ecology. And finally, perhaps, it may be hoped that the geography student of advanced standing will have the opportunity of studying at competent hands the soil geography of the world, and that laterite, chernozem, and podsol will become as intelligible terms to him as are mesa, fiord, and doldrum.

He who would read on soils can do no better than to begin with "Soils," by E. W. Hilgard, which after fifteen years is still without need of major revision. Hilgard went into exile as State Geologist of Mississippi, as his colleagues who were hard rock geologists thought. On the Gulf Coast he gained the experience that made him the pioneer of American soil work. In this geologically apparently uninteresting area he found a virgin field of soil studies which have become of classical significance. With his widened experience he later became the builder of scientific research in agriculture thru the monumental development of experiment station work under his direction at the University of California. Hilgard's "Soils" is a book of extraordinary experience and wisdom. Professor King's "The Soil," in the Rural Science series, is the other and earlier American classic, perhaps most highly interesting in its discussion of drainage and irrigation. To these two primers of soil science should be added A. D. Hall's "The Soil," summarizing the British view-point in particular and based largely on the work of the world's most venerable experiment station, at Rothamsted, England. To this general list may be added a thoroly modern handbook by Lyon, Fippin, and Buckman, "Soils, Their Properties and Management," the most symmetrical treatment of the general subject in English.

It is proposed herewith to publish in the *Journal of Geography* a series of summaries of recent work in soils that is of general geographic significance. These summaries will appear from time to time under the heading employed in this introductory statement.

GEOGRAPHY AND THE AUTOMOBILE

CLIFFORD M. ZIERER
Indiana University[1]

Geographic factors have affected the automobile industry. Furthermore, its rapid expansion has made it difficult for teachers to keep up with its growth. Hence the following summary may be helpful.

[1] Acknowledgment is hereby made to Prof. S. S. Visher for assistance.

Twenty years ago automobiles were barred from the boulevards of some of our cities as a menace to life and limb. By 1910 the period of experimental car building in America was practically over. Today the automobile industry is the largest producer of finished products in the country with a total output including accessories of approximately four and one-half billion dollars annually. Indeed, the United States now manufactures more than all the rest of the world combined, and exports far more than any other country. The rapid growth of the industry is illustrated by the increase from about 5,000 cars built in 1900 to over 2,000,000 built in 1920. This brilliant industrial success is due to America's vast wealth, its vast stores of resources and its vast distances, all of which tended to form the basis for some tremendous improvement in the art of transportation.

IMPORTANCE OF THE INDUSTRY

The importance of the automobile is suggested by the amount of capital invested and the great sums of money kept in active circulation by the purchase of materials and payment of wages; the hundreds of thousands of persons dependent upon the industry for a livelihood; and the increased wealth brought to American workingmen and investors by the exportation of American motor vehicles and parts.

The year 1920 was one of great production in the industry. The National Chamber of Commerce announces that the auto was second only to steel in value of output. The production amounted to 1,875,000 passenger cars and 340,000 trucks with a combined value of $2,200,000,000. Exports of motor cars for this year were 172,000 vehicles valued at $380,000,000; England leading with purchases amounting to $21,000,000; following in order of amounts purchased are India, Canada, Australia, New Zealand, South Africa, Cuba, Brazil and Argentina.

There are 170 motor truck manufacturers and ninety passenger car manufacturers, located in thirty-two states. The capital invested is approximately $1,400,000,000, and employment is given to 300,000 persons. There are 6,789 concerns engaged in producing some articles used in the automobile trade. The tire industries alone in 1920 turned out 32,400,000 tires valued at about $800,000,000. The dealers, garages, repair-shops and so on employ a quarter million workers and have investments of about $200,000,000. The automobile accessory and supply business, including tires, gasoline and oil, has reached a volume greater than that of the automobile industry itself, namely $2,400,000,000.

AN ASSEMBLING INDUSTRY

"Co-operative competition" is the phrase that expresses the condition prevailing in the industry today. The object back of all this is to encourage general practices that will be for mutual benefit. Thru the development of the idea of quantity production the majority of all automobile manufacturing companies make less than twenty per cent of all the parts included in their manufacture, eighty per cent being produced by the part makers. By the application of fabrication of materials in the automobile industry, increased numbers of cars, made of better material, are turned out at lower cost. This also accounts for the concentration of the industry in the United States.

The three largest automobile manufacturing cities listed according to rank are, Detroit, Indianapolis, and Cleveland. There are a number of other cities famous for their automobiles: Toledo, Ohio; Flint, Mich.; Kokomo, Ind.; Kalamazoo, Mich.; Connersville, Ind.; Muncie, Ind.; Jackson, Mich.; and Richmond, Ind. Indianapolis produced 95,000 cars in 1920 valued at $167,337,500 and exported cars valued at $5,445,000. The capital invested in the industry in Indianapolis is $25,000,000, and employment is given to 14,000 workers.

NINETY PER CENT OF CARS USED FOR BUSINESS

The average life of a car is estimated at five years. In 1920 the average wholesale price of passenger cars produced was $897, while the average wholesale price of motor trucks produced was $1,273. Only about one car in ten is used for recreation only. The states which have the largest number of automobiles have also the largest number of motorcycles. More than 400,000 tractors are used in the United States. The states having the greatest number of tractors in order are: Michigan, California, Iowa, Kansas, Indiana, Wisconsin and Louisiana.

FARMERS OWN MANY CARS

Due to the time-saving element in the use of automobiles, the horse is being replaced by them for delivery purposes, taxi business, fire departments and all kinds of heavy hauling. Even on the farm the automobile, due to its greater carrying capacity, superior speed, convenience and indefatigableness is replacing many horses. The fact that one and one-half times as many automobiles in proportion to population are owned in the Central and Western States as in the

manufacturing states of the east indicates that the farmers, who need transportation most, appreciate the facilities for quick and convenient transportation supplied by the motor car. It is estimated that forty-five per cent of the automobiles are owned by farmers and small townsmen. There are about 900,000 trucks in the United States hauling an average of 4½ tons per day each or about 400,000,000 tons of materials during the year at a cost averaging eighteen cents per ton mile. This represents about fifteen per cent of the entire freight haulage of the nation. Haulage by horse is estimated to cost twenty-four cents per ton mile and it is said that truck haulage has released 3,600,000 horses for various other purposes in the United States. Since a horse requires about five acres of land for his support, it will be seen that a vast acreage of land may be used to produce crops for other purposes. Cost per ton mile by railroad is about two cents, but the railroad terminal charges are large. Furthermore much time is saved by the motor truck.

BUILDER OF GOOD ROADS

The automobile has also increased land values by giving a ready means of transportation for areas some distance from railroads. The truck enables the farmer, living many miles back from the railroad, to market his produce with little loss of time and at low cost. Automobiles benefit the railroads by increasing their long haul traffic thru this opening up of new areas of production. It has also aided in making farm life more attractive by giving farmers living four or five miles from town many of the advantages that were formerly enjoyed only by those living within a mile of town. The automobile is a "builder of good roads." Expenditures for 1921 for road building in this country were over $600,000,000. Better roads will increase transportation facilities, lessen the cost of hauling and up-keep of vehicles, add to land values, and make farm life more attractive. The amount of dust in cities and towns is greatly reduced when horses are replaced by motor vehicles. The number of flies is also diminished by reducing the number of horse stables where they breed in great numbers.

INFLUENCE ON OTHER INDUSTRIES

The great expansion of the automobile industry has raised wages because it has lured skilled and unskilled labor from other less gainful occupations. But this additional cost of labor has accelerated general prosperity that has more than met the increase in the resulting

general cost of living. The cotton industry has felt the effect of the automobile in the increased demand for long-staple cotton for use in tires; the plate-glass industry for its products to provide wind-shields for cars. Textile mills, steel foundries, railways, the meat-packers, the farmer, nearly every producer has something that goes into the making of the automobile and this increasing ready market naturally increases values.

USE OF ALLOY METALS

The speed, in fact the very existence, of the automobile depends on steel. The axles and other parts of the automobile that must bear severe strains are made of alloys of steel, manganese steel, chrome steel, remarkable for its hardness, and vanadium steel which is very tough. The United States is the largest consumer of these alloys of steel. We mine nearly all the ordinary iron ore consumed here but are dependent upon other parts of the world for these alloy ores. According to the "World Atlas of Commercial Geology" recently issued by the United States Geological Survey, the United States uses fifteen per cent of the world's supply of manganese, importing all of it from India, Russia and Brazil. We use thirty-eight per cent of the world's supply of chromium and import all of it from New Caledonia and Rhodesia. Three-fourths of our supply of vanadium comes from Peru. We use twenty-nine per cent of the world's supply of nickel and have no production. Three-fourths of our supply of molybdenum comes from Australia and one-sixth from Norway. Indeed this dependence of the automobile industry on special ores from other regions has compelled many leaders to realize that the United States is not self-sufficient and must play a part in world affairs.

The automobile has made serious inroads upon the business of railroads by taking from them much of their short haul business. Since it is cheaper to build good highways than to build new railroads, the latter have not been extended as formerly. Local railroad passenger travel is also greatly reduced by the automobile. The automobile is responsible for a great many accidents which result in the loss of many lives and many serious injuries. It also adds to the nervousness of many persons because of the increased tension which it brings about.

DISTRIBUTION OF CARS

Every state in the union has taken advantage of the revenue-producing possibilities of the automobile. The total revenue thus

obtained in the forty-eight states is now over $100,000,000 per year. All but about eight million of this goes toward the maintenance of the roads. This represents largely the actual expense of administering the license bureau. Since all states issue and record licenses we have here an excellent means for measuring the growth of the automobile habit. There are of course the figures for annual production but in the absence of figures for annual scrapping, these would be misleading. Turning to the license figures, we find that New York leads with something like 669,290 vehicles in 1920. Ohio takes second place with 615,397 vehicles, Pennsylvania is third with

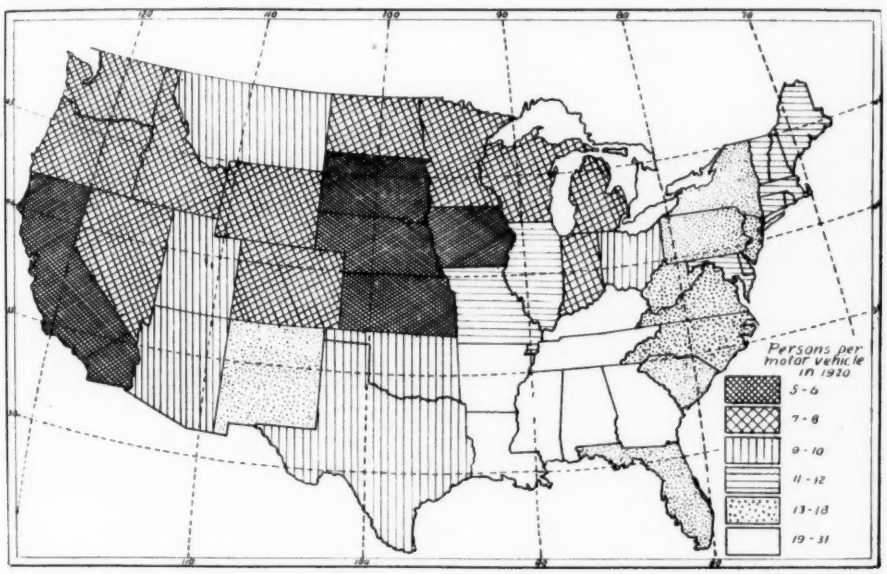

FIG. 1. Persons per motor vehicle in 1920

570,164, California fourth with 568,892 and Illinois fifth with 568,759 vehicles. Following in order are Iowa, Texas, Indiana, Massachusetts and Missouri. The states do not follow exactly in the order of their population for many other factors help determine the extent to which the citizens of a state need and can afford the automobile. The total net registration of motor vehicles for the entire country for 1920 is 8,932,458. We cannot express the number of automobiles per capita with anything other than a rather small fraction so we find it better to find instead the number of persons per car. Thence instead of showing the largest figure, the state where the automobile is most plentiful in porportion will show the smallest (See Fig. 1.).

SOUTH DAKOTA LEADS IN PER CAPITA DENSITY

We find that the banner state is South Dakota, one of the great farming states of the west with 5.24 persons per car, followed very closely by Iowa, Nebraska and Kansas. California, with its perpetual summer, its tourist industry and its wonderful roads also has less than seven persons per car. With the exception of New Mexico all the rest of the Western States along with North Dakota, Texas, Wisconsin, Oklahoma, Minnesota, Michigan, Indiana, and Ohio come into the second class with one motor car for each seven to ten persons. In other words, the entire country west of the Mississippi, save for New Mexico, Arkansas, and Louisiana, has more than one car for each ten persons; and there are but five states east of the Mississippi River that can equal this showing. The reason for this is obvious; the vast western states have great distances to travel, and lack sufficient railroads; or where they have a fair share of railroads, as in Iowa, their agricultural interests are so heavy that a large number of automotive vehicles is necessary to haul the crops and transact the rest of the multiform business about the farm.

UNITED STATES HAS ONE CAR FOR EVERY TWELVE PERSONS

Wisconsin and Minnesota, it seems would account for their heavy motor car investments on the same grounds as Iowa; while the combination of large cities and agricultural regions in Michigan, Ohio, Indiana, Missouri and Illinois calls for large numbers of cars and trucks. Vermont, Connecticut and Rhode Island doubtless outstrip their eastern neighbors because they are at once communities of commuters, of summer vacationists and of big manufacturers. Texas and Oklahoma, aided by their oil fields, are emancipating themselves more rapidly from the thrall of the one-crop cotton than the true South, while they have greater distances to conquer. Florida with its winter tourist and vacation industry, is able to outstrip its neighbors. It is not at first glance clear why all New England should outstrip New York or why New Jersey, Delaware and Maryland should pass Pennsylvania; but the answer is doubtless to be found in a consideration of the heavy percentage of poverty among the New York and Pennsylvania urban population and the heavier expense of owning a car in the big cities. It is in this eleven-to-fifteen persons per car group that the average for the entire country falls; for with something above 105,000,000 population and about 9,000,000 motor vehicles, we get a quotient of appoximately twelve persons per motor as compared with one for every 2,182 persons in the rest of the world,

268 in England, 402 in France, 684 in Germany and 5,300 in Russia.

A further study of Fig. 1, and the license statistics reveals that the United States may be divided into four sections as follows: (1) agricultural states, (2) manufacturing states, (3) mining states, (4) southern states. As would be expected from their larger population the manufacturing states show the largest total registration:

	CARS	PERSONS PER CAR
Manufacturing States	3,607,750	12.00
Agricultural States	2,468,093	8.10
Southern States	1,084,050	20.08
Mining States	374,106	8.90

This shows that about half of the total number of cars and trucks in use are concentrated in the big manufacturing states. The relative

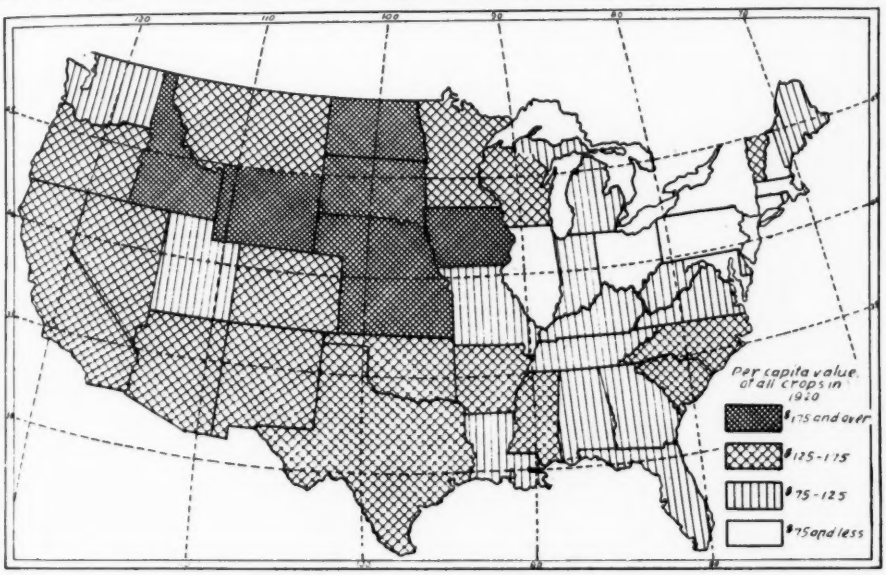

FIG. 2. Per capita value of all crops in 1920

density of automobiles in these various sections brings the agricultural and mining states to the front.

SALES INCREASE IN THE SOUTH

The southern states have consistently lagged behind due to several factors: (1) Roads in this section of the country are not nearly as good as in the states comprised in the other groups. (2) A large negro population, most of which does not comprise a market for automobiles, makes the figures for this group of states somewhat higher than it would be if only potential automobile buyers were

included. There is also a large number of the poorer whites in the South who cannot afford to buy automobiles. (3) Lack of educational facilities and popular education as compared with the North. Automobile sales commonly increase as the general level of education rises. However, the ten states making the largest percentage gain in number of cars are all southern states proving that the South is only in the beginning of its motor development.

There is a general relation between the per capita value of the state agricultural crop (Fig. 2) and the automobile population, and it may be said that the per capita crop valuation is a fairly accurate indicator of the automobile population. Comparison with Fig. 1, showing the per capita density of autos, reveals a rather close correspondence. In the states having many large cities the correspondence between the per capita crop valuation and density of automobiles is not as close as is the case in the agricultural states. This map (Fig. 2) also shows that the South possesses a large potential buying power and hence we may expect increasing sales of automobiles there.

SUMMER SESSION COURSES IN GEOGRAPHY, 1922

Compiled by F. E. WILLIAMS

University of Pennsylvania

The following is a list of courses in geography to be given in the summer sessions of the educational institutions from which definite reports have been received.

University of Colorado, Boulder, Colo.

First Term (Opens June 19)

Climatology. P. G. Worcester
General Geography. L. F. Thomas
Field Geography. L. F. Thomas
Geography and Commerce. L. F. Thomas
Geographic Influences. W. E. McCourt
Geography of South America. P. G. Worcester

Second Term (Opens July 31)

Geography of North America. L. F. Thomas
Political Geography. L. F. Thomas
Geography and Commerce. L. F. Thomas
Geography of Colorado. P. G. Worcester
Field Course. W. E. McCourt and W. O. Thompson

The Field Course in Geography and Physiography.

Begins July 31st and ends August 26th. The course is given at the University Camp about twenty-five miles west of Boulder. There are particularly good opportunities for both elementary and advanced studies of physiography. Total cost $100.00. Open only upon consultation with Professor McCourt. Address at Washington University, St. Louis, Missouri until June 19th, then Boulder, Colorado.

University of Chicago, Chicago, Illinois.

Elements of Geography. First Term. Assistant Professor Jones

Economic and Commercial Geography. Second Term. Dr. Platt
Field Course in Green Bay, Wisconsin, Region. First Term. Dr. Platt
Geography of the Scandinavian Countries. Professor DeGeer (University of Stockholm)
The "New Europe." Professor DeGeer
Influence of Geography on American History. Professor Barrows
Conservation of Natural Resources. Professor Barrows
Geography of Asia. Assistant Professor Jones
Ocean Trade and Transportation. First Term. Assistant Professor Colby
Field Course in Lower St. Lawrence Valley and the Maritime Provinces of Canada. Second Term. Assistant Professor Colby
Pro-Seminar in Geography. First Term, Professor Barrows and Assistant Professor Colby; Second Term, Assistant Professor Jones and Dr. Platt
Research Course. Professor Barrows and Assistant Professors Jones and Colby
The Technique of Teaching Geography in the Grades. First Term; repeated Second Term. Miss Parker
The Organization of Geographic Problems. First Term; repeated Second Term. Professor Miller (State Teachers College, Mankato, Minnesota)
Problems of Geographic Instruction in Normal Schools. Professor Miller
Investigations of Problems in Geography. Miss Parker

University of Illinois, Urbana, Ill.

Principles of Geography. Miss Ashton
Geography of Europe. Dr. Blanchard
Weather and Climate. Dr. Blanchard

Northwestern University, Evanston, Ill.

Physiography. Dr. Helen Mabel Strong (Assistant Professor of Geology, University of Missouri)
Commercial Geography. Dr. Strong
Field Course in the Lake Superior Region.

Open to men who have completed at least a year's course in geology, but more work than this will be an advantage. The course will begin about August 7 to 14 and last four weeks. A detailed report will be required. Advanced students may obtain additional credit and may in some cases secure material for a Master's thesis. (Tuition for all students $50.00; for those who are not already matriculated in Northwestern University there will be the regular matriculation fee of $5.00.) Correspondence concerning this course should be addressed to Professor U. S. Grant, University Hall, Evanston, Ill.

Chicago Normal College, Chicago, Ill.

The Teaching of Geography. Fred K. Branom
Geography of Asia. Fred K. Branom
Industrial and Commercial Geography. Fred K. Branom
Geography of South America
Geography of Europe
Geography of North America
} Will be offered if there is sufficient demand.

Illinois State Normal University, Normal, Ill.

Physical Geography. H. H. Russell
Country School Geography. Eulalia Tortat
Home Geography. Eulalia Tortat
Intermediate Geography. H. H. Russell
Geography of South America. C. E. Cooper
Geographic Controls. C. E. Cooper
Climatology. R. Schofield
Geography of Europe. R. Schofield
Conservation of Natural Resources. R. Schofield

Methods in Geography. R. Schofield
Human Geography. H. H. Russell

Northern Illinois State Teachers College, DeKalb, Ill.

First Term. (June 5 to July 14)
Elements of Geography. S. R. Arseneau
Geography for the Seventh Grade, South America and Europe. S. R. Arseneau
Influences of Geography on American History. R. G. Buzzard
Geography for the Fifth Grade, World as a Whole. R. G. Buzzard
Geography for the Fourth Grade, Home Geography. R. G. Buzzard

Second Term. (July 17 to August 25)
Regional Geography. R. G. Buzzard
Commercial Geography. R. G. Buzzard

Western Illinois State Teachers College, Macomb, Ill.
The Teaching of Geography. Mr. Basset and Mr. Harris
Physiography. Mr. Bassett
The Geography of Europe. Mr. Harris

University of Iowa. Iowa City
Introduction to Geography. Mr. McMurry and Mr. Jordan
Geography of Commercial Products. Mr. McMurry and Mr. Jordan
Geography of South America. Mr. McMurry and Mr. Jordan

Indiana State Normal School, Eastern Division, Muncie, Indiana
Principles of Geography. Asst. Prof. Blanche McAvoy
Geography of the United States. Professor Fred J. Breeze
Geography of Indiana. Professor Fred J. Breeze
Physiography. Asst. Prof. Blanche McAvoy
Field Physiography and Geography. Field work in Glacier National Park and Puget Sound Region. Last half of summer quarter. Professor Fred J. Breeze

University of Kansas, Lawrence, Kansas
Elementary Physical Geology. C. J. Posey
Geography of South America. C. J. Posey
Field Geology. Five hours credit. A five weeks' field course devoted to the study of the geology and physiography of parts of Kansas and Colorado, or other selected area. Registration only after consultation with the department. W. H. Schoewe

Kansas State Normal School, Emporia, Kansas
Economic and Industrial Geography
Economic Geography of North America
Economic Geography of South America. Jane K. Atwood
Teaching Geography in Junior High Schools and Intermediate Grades. Jane K. Atwood
Teaching Geography in Rural Schools
Social Significance of Geography. Jane K. Atwood

Clark University, Worcester, Mass.
The Passing Weather. Mr. Brooks
Physical Geography. Mr. James
The Teaching of Geography in the Elementary School. Mr. Ridgley
Geography of North America. Mr. Atwood
The Regional Treatment of Geography. Mr. Atwood
The Influence of Climatic Environment. Mr. Brooks
Geography of South America. Mr. James
The Natural Resources of the United States and Their Conservation. Mrs. Thomas
Geographical Changes Resulting from the World War. Mrs. Thomas
The Teaching of Geography in Normal Schools and Normal Training Colleges. Mr. Ridgley

Research in Regional Geography. Mr. Atwood
Research in Climatology. Mr. Brooks

University of Michigan, Ann Arbor

Introduction to Geography. Asst. Prof. D. H. Davis
Geography of Commercial Products. Asst. Prof. D. H. Davis
Physiography for Teachers. Professor I. D. Scott
Excursions to Niagara Falls, Put-in-Bay, and local points of interest

Field Course in Geography. Location: Camp on Upper Cumberland, Kentucky; trip includes reconnaissance of Valley of East Tennessee and Great Smoky Mountains. Time: June 10 to July 31. There will be two parties of fifteen each, one in geography and one in geology. The work includes systematic observations on the utilization of an area located on the Highland Rim at the edge of the dissected Cumberland Plateau, together with a study of the physical geography of the area. The students are introduced also to the identification of soil types, but the main emphasis is on productive significance of the region. Director of Field Courses, Professor C. O. Sauer

Michigan State Normal College, Ypsilanti, Mich.

Elementary Geography. Margaret Sill
Commercial Geography. Margaret Sill. (two sections)
Teachers Geography. Mark Jefferson and Raye Roberts Platt. (three sections)
Geography of Latin America. Mark Jefferson

State Teachers College, Mankato, Minn.

Principles of Geography. (two sections) Mr. Hudgens and Miss Puder
Geography of North America. Mr. Hudgens
Laboratory and Field Work. Miss Keller

Southwest Missouri State Teachers College, Springfield, Missouri

Industrial and Commercial Geography. Miss Moina Prater
The Geography of North America. Miss Moina Prater
The Geography of Europe. Miss Moina Prater
The Teaching of Geography. Miss Moina Prater
Principles of Geography. P. E. Andrews
Physiography. P. E. Andrews
Field Course in Geography. Miss Moina Prater

Three weeks (Aug. 5-26) will be spent in Colorado, Utah, and Yellowstone Park. The notable physiographic features of the Northern Rockies, irrigation farming, mining and smelting, ranching will be studied. A written report will be required.

Cornell University, Ithaca, N. Y.

Physical Geography. Dr. Carlson
The Geography and Industry of the United States. Assistant Professor Williams
The Geography of Europe. Assistant Professor Williams
Mineral Resources. Associate Professor Monnett
Physical Geography, Laboratory Course. Dr. Carlson
Afternoon Excursions (Five). Dr. Carlson
Longer Excursions.—Taughannock Gorge and Falls; Enfield Gorge; Niagara Falls (Two days); Watkins Glen. Assistant Professor Williams

Ohio State University, Columbus

Principles of Geography. Mr. Huntington
Economic Geography. Mr. Huntington
Historical Geography of the United States. Mr. Van Cleef
The Geography and History of Commerce. Mr. Van Cleef

Miami University, Oxford, Ohio

The Home Environment
Home Life in Other Lands
Elements of Geography

Industrial Geography of the United States
Political Geography
Professor W. R. McConnell, Mary Dorrell Finch, Alice Maiter

Cleveland School of Education, Cleveland, Ohio

Principles of Elementary School Geography. Miss Matchett
Methods in Elementary Geography. Miss Matchett. (Demonstrations in classes daily)
Industries of Cleveland

A field course in which twenty-five major industries are studied to obtain first hand information and material for instruction. Each industry is given a special study, which is embodied in a report. Mr. Gregory and Miss Matchett

The Teaching of Junior High School Geography. Mr. Gregory. (Demonstration classes daily)
Regional Geography of the United States. Miss Matchett
Commercial and Industrial Geography. Mr. Gregory

Oberlin College, Oberlin, Ohio

Field Geology and Geography

This course is intended as a preparation for advanced work in geology, and as a basis for the teaching of geology and physical geography. The field for 1922 is selected because it contains examples of a large number of geologic phenomena. It is located in western Virginia and West Virginia, where New River cuts thru the Appalachian Mountains. The rocks from the Cambrian thru the Mississippian are exposed in the vicinity. The field work consists of making a topographic map of the area and mapping the areal geology. Students furnish their own tents and camp equipment, or rent them from the department, and camp during the entire course. Professor Hubbard

George Peabody College for Teachers, Nashville, Tenn.

Geography of the Lands. Mr. Chambers
Fundamentals of Regional Geography. Mr. Chambers
Economics and Commercial Geography: United States. Miss Mosby
The Teaching of Geography. Mr. Parkins
Geography of North America. Mr. Parkins
Conservation of Natural Resources. Mr. Chambers
Influence of Geography on American History. Mr. Parkins
Seminar in Geography. Mr. Parkins

University of Wisconsin, Madison

Physical Geography, Mr. Smith
Commercial and Industrial Geography for Teachers (North America and Europe), Mr. Frey
The New World. Professor Whitbeck
The Geography of Latin America. Mr. Trewartha
Overseas Commerce. Mr. Frey
Agricultural Geography. Professor Finch
Glaciers and Glaciation. Mr. Smith
Climatic Factors in Geography. Mr. Trewartha
A Summer Field Course at Devils Lake. During August, four weeks. Open to men only. Mr. Smith
Rocky Mountain Physiography Field Studies, June 10 to July 5th.

The course is given jointly with Columbia University. It includes Rocky Mountain National Park, Pikes Peak, Garden of the Gods, Royal Gorge, Yellowstone and Glacier National Parks. Cost from Chicago about $332. Address Dr. A. K. Lobeck.

Meteorology. Mr. Miller
Climatology, Mr. Miller

State Normal School, Whitewater, Wisconsin
Commercial Geography I (Commercial Commodities)
Commercial Geography II (Geography of Commerce)
Economic Geography of Europe & South America
Political Geography
Geography Methods (Primary)
Geography Methods (Grammar)
Geography Methods. (Rural)
Physiography
Conservation of Natural Resources
H. O. Lathrop and C. C. Lemon

GEOGRAPHICAL NEWS

The Commercial Education Service of the Federal Board for Vocational Education has prepared recently an "Outline for the Study of an Agricultural Commodity," and an "Outline for an Introductory Course in Economic Geography." A carefully selected list of references accompanies the outlines. These outlines should be of great service to elementary and secondary school teachers. Copies may be obtained gratis by addressing E. W. Barnhart, Chief, Commercial Education Service, Federal Board for Vocational Education, Washington, D. C.

All students of geography are interested when a new school for the training of geographers is established. This interest is continued and increased with the efforts to attain success and to extend the usefullness of the institution. The new School of Geography at Clark University has arranged for an extensive series of lectures for its spring and summer sessions. Among the lecturers are, Dr. Homer L. Shantz, of the United States Bureau of Plant Industry, Dr. H. W. Whitford of Yale, Dr. Curtis F. Marbut of the United States Bureau of Soils, Dr. Alfred H. Brooks, United States Geological Survey, Dr. George M. McBride of the American Geographical Society, Dr. O. E. Baker, United States Bureau of Farm Management, Dr. Stanislaus Novakovsy from Russia, Dr. Joseph M. Goldstein of the University of Moscow, C. M. Oberoutcheff of Russia, Dr. Alexander Petrunkevitch of Yale, and A. J. Sack of the Russian Information Bureau, New York.

The World Agriculture Society is the name of an informal organization created recently with headquarters at Amherst, Massachusetts. "It aims to promote a sympathetic understanding between consumers and producers of all nations by (1) gathering and publishing facts concerning the production, distribution and use of agricultural commodities in all countries; (2) encouraging the formation of study groups to consider problems of rural life and of the world's food supply; (3) securing international exchange of students and teachers of agricultural subjects; (4) conducting a campaign of popular education to show that competition for control of the means of subsistence brings war and the destruction of the things contended for, whereas cooperation in the conservation and use of the earth's natural resources is the foundation for world peace. The organization publishes the quarterly magazine *World Agriculture* which geography teachers will find suggestive and useful. Dr. Kenyon L. Butterfield is the President and Professor Laurence H. Parker, Amherst, Massachusetts is Executive Secretary to whom correspondence should be addressed.

Two new State Councils of Geography Teachers have been established recently; one in South Carolina under the directorship of Professor Otto Harris, Winthrop College; the

other in Oklahoma under the directorship of Professor C. J. Bollinger of the University of Oklahoma. Successful meetings have been held in both states.

A New England Geographical Conference was held January 20, 1922, at Clark University, the theme of the program being the Training of Teachers of Geography. The wide interest in the conference was manifested by the attendance of two normal school presidents.

The following papers were presented: "The Present Status of Geographic Work in the Normal Schools, and Certain Proposed Improvements," Robert M. Brown; "Some Aspects of Geography Work Which Should be Emphasized in Normal Schools," Mabel C. Stark; "The Training of Special Teachers of Geography," Wallace W. Atwood.

The following resolutions were presented and adopted unanimously.

Resolved, That no normal school is adequately preparing its graduates to teach geography in the elementary grades if it does not require a minimum of three periods per week for one year in that subject.

Resolved, That the department teachers of geography, training school teachers, and supervisors of the subject should have special professional training in geography to fit them for their work.

Resolved, That the distribution of time between content and method is of such importance that the determination of their proper ratio be made the subject of further investigation by the National Council of Geography Teachers.

It was proposed to establish an organization to be known as the New England Section of the National Council of Geography Teachers if suitable provisions for affiliation with the National Council could be arranged.

GEOGRAPHICAL PUBLICATIONS

James Fairgrieve. **Geography and World Power.** 373 pp., 80 sketch maps. E. P. Dutton and Co., New York. 1921.

"Geography and World Power" is a short résumé of the world's history with its relation to geography. The author defines history as "the story of man's increasing ability to control energy" and he states that "the way in which man has come to be able to use more and more energy has been determined by distributions on the earth's surface."

Mr. Fairgrieve traces the history of the world from ancient Egypt, Babylonia, and Assyria, to the modern world, and tells us at each stage the geographic control of the particular bit of history. For example, it is pointed out that the reason why civilization started in Egypt was because of the geographic advantages of the people living in Egypt as compared with people living elsewhere.

The concluding chapter, "The Future Possibilities" is especially worth studying. We are told that the possibilities for advance of the world are two. "The controls already affecting us might either act differently or further supplies of energy which have not been used in the past might become available."

The author's hypothesis is applied to each historical fact and tested. The information and views contained in this book are not only valuable to the geographer and historian but are also significant to the general reader.

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